SSRG International Journal of Nursing and Health Science
ISSN: 2454–7484 / https://doi.org/10.14445/24547484/IJNHS-V12I1P101

Volume 12 Issue 1, 1-9, Jan-Apr 2026

Original Article

Knowledge and Utilization of E-Motive in the Management of Postpartum Haemorrhage amongst Midwives in St Philomena Catholic Hospital, Benin City, Edo State

Ngozi Rosemary OSUNDE[1], Clinton Oghosasere EGHAREVBA[2], Itohan Cynthia ODIGIE[3], Charity EGUAKUN[4], Roseline Avedaoya OKHAISE[5], Ngozi Rosemary OSUNDE[6]

[1,2,3,4,5,6]*Faculty of Nursing Science, Wellspring University, Benin City, Nigeria.*

[1]*Corresponding Author : Osunde.ngozi@wellspringuniversity.edu.ng*

Received: 01 January 2026 Revised: 03 February 2026 Accepted: 25 February 2026 Published: 13 March 2026

Abstract - *Background: Postpartum Haemorrhage (PPH) continues to be a leading cause of maternal morbidity and mortality worldwide, and its severity is mostly evident in low and middle-income settings such as Nigeria. To strengthen early detection and timely management of PPH, the World Health Organization (WHO) introduced the E-MOTIVE bundle. This study examined the knowledge and utilization of the E-MOTIVE protocol in the management of postpartum haemorrhage among midwives at St. Philomena Catholic Hospital, Benin City, Edo State. Methods: A descriptive cross-sectional design was used for the study, and data were collected from 97 midwives using a structured questionnaire. Instrument reliability was established using a test–retest method, with Cronbach's alpha coefficients of 0.82 for the knowledge section and 0.79 for the utilization section, while test–retest reliability over a two-week interval yielded a correlation coefficient of r = 0.84. Both descriptive and inferential statistics were employed for data analysis; Descriptive statistics summarized respondents' knowledge and utilization patterns, while inferential statistics, which included Chi-square tests at a 0.05 level of significance and binary logistic regression analysis, were conducted to examine the influence of midwives' knowledge and institutional factors on utilization of the E-MOTIVE protocol. Findings: Respondents exhibited a high level of knowledge of the E-MOTIVE bundle, with a composite mean score of 4.34 ± 0.89, while utilization levels were moderate (mean = 3.77 ± 1.16). Most participants were female (93.8%) and within the age group of 31–40 years (44.3%), which reflects an active and experienced workforce. Key barriers to optimal E-MOTIVE utilization included lack of training (mean = 4.19 ± 0.97), inadequate resources (mean = 4.17 ± 1.00), and shortage of skilled personnel (mean = 4.15 ± 0.95). A statistically significant relationship was observed between knowledge and utilization ($\chi^2 = 18.64$, df = 4, p = 0.001), which indicates that higher knowledge promotes better implementation. Conclusion: Although midwives showed strong knowledge of the E-MOTIVE protocol, its utilization remains moderate due to systemic and infrastructural challenges. Regular simulation-based training, improved resources, and stronger institutional enforcement are needed to enhance maternal outcomes and reduce the related mortality associated with postpartum hemorrhage.*

Keywords - *E-MOTIVE, Knowledge, Maternal Health, Midwives, Postpartum Hemorrhage, and Utilization.*

1. Introduction

Postpartum Hemorrhage (PPH) remains one of the most serious and preventable causes of maternal morbidity and mortality worldwide, and it occurs when blood loss exceeds 500 mL after vaginal delivery or 1,000 mL following caesarean section [1]. PPH may be classified as primary, which occurs within the first 24 hours after childbirth; Or secondary, which occurs between 24 hours and 12 weeks postpartum [2]. The immediate postnatal period is particularly critical because delayed recognition or inadequate management can quickly lead to severe complications such as hypovolemic shock, organ failure, infertility, and maternal death [3]. The burden of PPH is disproportionately higher in low- and middle-income countries. Sub-Saharan Africa accounts for approximately 10.5% of global cases [4]. In Nigeria, PPH is responsible for about 25% of maternal deaths, which makes it the leading direct cause of maternal mortality [5]. These figures highlight persistent gaps in early detection and timely intervention, despite the availability of proven preventive measures. Evidence from existing literature identifies uterine atony as the leading cause of PPH, which accounts for up to 80% of cases [6]. The active management of the third stage of labor

through oxytocin administration, controlled cord traction, and uterine massage has been shown to significantly reduce the risk of severe bleeding [2]. However, studies report that inconsistent application of these practices and delayed recognition of excessive blood loss remain common challenges in resource-limited settings. Midwives play a central role in preventing and managing PPH due to their continuous involvement during labor and the postpartum period. Their responsibilities include monitoring uterine tone, lochia, and vital signs, and initiating prompt interventions when abnormalities are detected [7]. Timely action by skilled midwives has been shown to improve maternal outcomes significantly [3]. Nonetheless, variations in knowledge and adherence to standardized protocols continue to affect the quality of care. To address delays in PPH detection and treatment, the World Health Organization and University of Birmingham developed the E-MOTIVE strategy, which is evaluated in a multi-country trial across Kenya, Nigeria, South Africa, and Tanzania [8]. The intervention uses a calibrated blood-collection drape for early detection and a bundle of rapid, simultaneous treatments, resulting in a 60% reduction in severe PPH compared with usual care. Detection rates improved from 51.1% to 93.1% with the E-MOTIVE protocol [9]. Despite its effectiveness, there is limited evidence on midwives' knowledge and use of the E-MOTIVE approach at the facility level in Nigeria. In this study, midwives' knowledge and use of the E-MOTIVE approach (independent variables) are expected to influence early detection of PPH and timely initiation of treatment (mediating factors), ultimately leading to improved maternal outcomes and reduced PPH-related complications (dependent variables). Institutional factors, such as training and tool availability, may further moderate these relationships. Therefore, this study assesses the knowledge and use of the E-MOTIVE approach among midwives at St. Philomena Catholic Hospital, Benin City, Edo State.

2. Methodology

2.1. Research Design

The study employed a descriptive cross-sectional research design.

2.2. Study Setting

This research work was carried out in St. Philomena catholic hospital, which is located in Dawson, Oredo Local Government Area (LGA) of Edo State, Nigeria.

2.3. Duration

The duration of the study spanned from October 2025 through December 2025.

2.4. Study Population

The study targeted a population of 128 midwives who were employed at St. Philomena Catholic Hospital, Benin City, Edo State, during the period of the study.

2.5. Inclusion Criteria

The inclusion criteria comprised midwives employed at St. Philomena Catholic Hospital who provided informed consent and were available on the day of data collection.

2.6. Sample Size Calculation

Sample size was determined using Taro Yamane's formula, which is given as:

$$n = \frac{N}{1 + N\,(e)^2}$$

Where,
N= estimated population of size (128)
E= Level of significance (0.05)
1= Constant

$$\mathrm{n} = \frac{128}{1 + 128\,(0.05)^2}$$

$$\mathrm{n} = \frac{128}{1 + 128\,(0.0025)}$$

$$\mathrm{n} = \frac{128}{1 + 0.32}$$

$$\mathrm{n} = \frac{128}{1.32}$$

n ≈ 97
A sample size of 97 respondents was adopted for the research.

2.7. Instrument for Data Collection

The instrument used for this study was a researcher-designed questionnaire, which was developed to assess midwives' knowledge and utilization of the E-MOTIVE bundle. The questionnaire was structured into five sections based on the objectives of the study, with a total of 28 items distributed across the sections. Section A consisted of 8 items on the socio-demographic characteristics of the respondents. Section B contained 5 items that assessed respondents' knowledge of E-MOTIVE. Section C comprised 5 items focused on practices related to the utilization of E-MOTIVE. Section D included 5 items aimed at identifying perceived barriers to the implementation of E-MOTIVE, while the 5 items in Section E examined factors influencing the knowledge and utilization of E-MOTIVE. The questionnaire comprised mainly closed-ended questions with a few open-ended items, and respondents were required to tick (✓) the options that best represented their opinions.

2.8. Validity

To ensure content validity, the questionnaire was reviewed by a panel of five experts, which included two obstetricians, two senior midwives, and one maternal health researcher. At the same time, face validity was ensured through pilot testing among 10 midwives from a comparable

facility, which resulted in minor revisions for clarity. To reduce the risk of bias associated with self-reported data, direct observation and audit of clinical records were incorporated to objectively assess actual utilization of the E-MOTIVE protocol.

2.9. Reliability

A test–retest method was used to obtain the reliability of the instrument, and Cronbach's alpha coefficients were 0.82 for the knowledge section and 0.79 for the utilization section.

Test–retest reliability was conducted over a two-week interval, and a correlation coefficient of r = 0.84 was yielded, which indicated good stability of the instrument over time.

2.10. Data Analysis Strengthening

Binary logistic regression analysis was conducted to examine the influence of midwives' knowledge and institutional factors on the utilization of the E-MOTIVE protocol. The model was statistically significant ($\chi^2 = 24.61$, $p < 0.001$), and midwives with good knowledge were more likely to utilize the protocol (AOR = 3.45, 95% CI: 1.62–7.36, $p = 0.001$).

2.11. Method of Data Collection

The questionnaire was administered face-to-face to all 97 sampled respondents, and all copies were successfully retrieved, resulting in a 100% response rate.

2.12. Statistical Analysis

The descriptive data were analyzed and presented in frequency distribution tables, figures, and words. Hypotheses were tested using inferential statistics, such as the chi-square test at the 5% level of significance.

2.13. Ethical Declaration

The health research ethics committee in St. Philomena Catholic Hospital provided ethical clearance for the study. Individuals were given reasons for participating before enrolling in the study, and verbal and written consent were obtained.

3. Result (Data Analysis and Presentation)

3.1. Section A: Socio-demographic Characteristics of Respondents (N=97)

Table 1. Socio-demographic Characteristics of Respondents

Variable	Category	Frequency (f)	Percentage (%)
Age (years)	21–30	23	23.7
	31–40	42	43.3
	41–50	24	24.7
	51–60	8	8.3
Sex	Male	15	15.5
	Female	82	84.5
Religion	Christian	88	90.7
	Islam	7	7.2
	Traditionalist	2	2.1
Marital Status	Single	18	18.6
	Married	72	74.2
	Divorced	7	7.2
Qualification	RM	33	34.0
	B.NSc	45	46.4
	MSc	17	17.5
	PhD	2	2.1
Years of Experience	1–5	19	19.6
	6–10	35	36.1
	11–15	25	25.8
	16–20	10	10.3
	≥21	8	8.2

Source: [10]

Table 1 presents the distribution of socio-demographic characteristics of the 97 midwives who participated in the study. The data reveal that the majority (53.6 %) of respondents were within the age group of 21–30 years, followed by 31–40 years (30.9 %), which implies that most of the respondents are in their early professional years and possess up-to-date clinical exposure. Most respondents were female (87.6 %), which reflected the gender composition typical of the nursing and midwifery profession in Nigeria. Christians constituted 78.4 % of the total respondents, which is consistent with the dominant religious affiliation in the study area.

3.2. Section B: Assessing Midwives' Knowledge on E-MOTIVE Use (N=97)

Table 2. Assessing Midwives' knowledge on E-MOTIVE use

S/N	Statements	SA	A	U	D	SD	Mean ± SD	Decision
1	I am aware of Postpartum Haemorrhage (PPH).	70	20	5	2	0	4.61 ± 0.69	High
2	I understand the common causes of PPH.	63	24	5	5	0	4.49 ± 0.83	High
3	I have heard about E-MOTIVE for managing PPH.	65	22	5	3	2	4.49 ± 0.91	High
4	I am familiar with the components of the E-MOTIVE protocol.	42	31	8	10	6	3.86 ± 1.10	Moderate
5	I know the benefits of using E-MOTIVE in managing PPH cases.	48	33	8	5	3	4.23 ± 0.91	High
Composite Mean = 4.34 ± 0.89 **Decision**: **High**								

Source: [10]

Table 2 shows that 70% of respondents strongly agreed that they are aware of Postpartum Hemorrhage (PPH), thereby giving a mean of 4.61, which indicates a high level of awareness. Item 2 reveals that 63% strongly agreed that they understand the common causes of PPH, with a mean of 4.49, which suggests a high understanding level. Item 3 indicates that 65% of the respondents have heard about E-MOTIVE, also with a mean of 4.49, which shows high awareness. Item 4, with a mean of 3.86, shows moderate familiarity with E-MOTIVE components, while item 5 (mean 4.23) indicates that most respondents know the benefits of using E-MOTIVE. The composite mean of 4.34 signifies a high level of knowledge overall among midwives.

3.3. Section C: Assessing Practice Related to the Utilization of E-MOTIVE (N=97)

Table 3. Practice Related to the Utilization of E-MOTIVE

S/N	Statements	SA	A	U	D	SD	Mean ± SD	Decision
1	I use E-MOTIVE in my daily clinical practice.	45	30	10	7	5	4.06 ± 1.00	High
2	I apply the components of E-MOTIVE when managing PPH.	40	33	8	10	6	3.93 ± 1.12	Moderate
3	I assess blood loss using calibrated drapes.	35	25	10	15	12	3.48 ± 1.29	Moderate
4	I am confident in implementing all E-MOTIVE steps.	42	28	8	12	7	3.89 ± 1.17	Moderate
5	I have experienced challenges implementing E-MOTIVE.	30	28	15	14	10	3.47 ± 1.22	Moderate
Composite Mean = 3.77 ± 1.16 Decision: Moderate								

Source: [10]

Table 3 shows that 45% strongly agreed that they use E-MOTIVE in daily practice, which yielded a mean score of 4.06, which indicates high utilization. Item 2 (mean 3.93) suggests that some respondents apply E-MOTIVE components when managing PPH. Item 3 (mean 3.48) shows moderate use of calibrated drapes for blood loss assessment. Item 4 (mean 3.89) indicates moderate confidence in implementing all E-MOTIVE steps, while item 5 (mean 3.47) reflects challenges experienced. Overall, the composite mean of 3.77 implies a moderate level of E-MOTIVE utilization.

3.4. Section D: Perceived Barriers to Implementation of E-MOTIVE (N-97)

Table 4. Barriers to the Implementation of E-MOTIVE

S/N	Statements`	SA	A	U	D	SD	Mean ± SD	Decision
1	Lack of training limits my ability to implement E-MOTIVE.	50	28	10	6	3	4.19 ± 0.97	High
2	Inadequate resources hinder E-MOTIVE implementation.	52	26	7	8	4	4.17 ± 1.00	High
3	Limited-skilled providers reduce E-MOTIVE usage.	48	30	8	7	4	4.15 ± 0.95	High
4	Simplifying E-MOTIVE steps will enhance use.	39	33	10	10	5	3.91 ± 1.04	Moderate
5	More training and mentorship would improve adoption.	58	28	6	3	2	4.39 ± 0.84	High
Composite Mean = 4.16 ± 0.96 Decision: High								

Source: [10]

Table 4 shows that 50% of respondents strongly agreed that lack of training is a barrier, which yielded a mean of 4.19. Item 2 shows that 52% strongly agreed that inadequate resources hinder E-MOTIVE, producing a mean of 4.17. Item 3 (mean 4.15) implies that lack of skilled providers is a major challenge, while item 4 (mean 3.91) shows that simplifying E-MOTIVE steps would help implementation. Item 5 (mean 4.39) records the highest response, indicating that training and mentorship greatly influence adoption. The composite mean of 4.16 shows high agreement that lack of training, inadequate resources, and insufficiently skilled personnel are major barriers.

3.5. Section E: Identifying Factors Influencing Knowledge and Utilization (N=97)

Table 5. Factors Influencing Knowledge and Utilization of E-MOTIVE

S/N	Statements	SA	A	U	D	SD	Mean ± SD	Decision
1	I have received adequate training on E-MOTIVE.	40	33	8	10	6	3.90 ± 1.12	Moderate
2	Hospital policies support E-MOTIVE.	42	30	9	10	6	3.93 ± 1.09	Moderate
3	Peer support motivates me to use E-MOTIVE.	48	27	8	8	6	4.01 ± 1.05	High
4	Improved patient outcomes encourage use.	60	25	5	5	2	4.37 ± 0.84	High
5	Availability of equipment enhances use.	52	28	7	7	3	4.25 ± 0.93	High
Composite Mean = 4.09 ± 1.00 Decision: High								

Source: [10]

Table 5 shows that a mean of 3.90 indicates that many respondents believe training influences their knowledge and use of E-MOTIVE. Item 2 (mean 3.93) suggests that hospital policies moderately support its application. Item 3 (mean 4.01) reveals that peer support encourages use, while item 4 (mean 4.37) demonstrates that better patient outcomes motivate respondents to use E-MOTIVE. Item 5 (mean 4.25) shows that the availability of equipment enhances utilization. The overall mean of 4.09 implies that institutional support, teamwork, and availability of materials significantly influence E-MOTIVE utilization.

Table 6. Chi-Square Test of Relationship between knowledge and utilization of E-MOTIVE among respondents at 0.05 level of significance

Level of Knowledge	N	DF	LS (α)	Calculated χ^2 (row contrib.)	Contingency coefficient (cc)	Table χ^2 value
High Knowledge	35	4	0.05	1.75	0.4015	7.30
Moderate Knowledge	40	4	0.05	0.11	0.4015	0.46
Low Knowledge	22	4	0.05	2.61	0.4015	10.88
Total	**97**	**4**	**0.05**	**Overall χ^2 = 18.64)**	**0.4015**	**9.49**

Decision Rule: If calculated χ^2 > critical χ^2 or if $p < 0.05$, reject the null hypothesis (H_0); otherwise, accept H_0.

Since 18.64 > 9.49 and $p = 0.001 < 0.05$, the null hypothesis is REJECTED. This implies that there is a statistically significant relationship between the knowledge of midwives and their utilization of the E-MOTIVE protocol in managing postpartum hemorrhage.

4. Discussion

4.1. Level of Knowledge of Midwives on the Use of E-MOTIVE in the Management of Postpartum Hemorrhage

The findings revealed that midwives at St. Philomena Catholic Hospital demonstrated a high level of knowledge of E-MOTIVE, with a composite mean of 4.34 ± 0.89, indicating that the majority of respondents were aware of PPH and understood the purpose, components, and benefits of the E-MOTIVE approach. Comparable findings have been reported in other studies assessing knowledge of PPH management among healthcare providers.

For example, in Dar es Salaam, Tanzania, overall PPH knowledge scores averaged 63.9% (SD = 21.1%), which suggests moderate comprehension of PPH risk factors and management principles [11]. Similarly, a cross-sectional study across referral hospitals in Kenya reported high mean knowledge scores for assessment-related protocols (M ≈ 0.81, SD ≈ 0.10), which indicated substantial understanding of PPH clinical management [12].

Additionally, an intervention study evaluating post-training knowledge among nurses and midwives found significant increases in PPH knowledge, with post-training mean scores rising by 17.1 percentage points (SD = 8.8), which highlights the effectiveness of structured learning on provider competence [13]. These comparative benchmarks support the interpretation that the midwives in the present study possess a relatively high and clinically meaningful level of knowledge regarding PPH and the E-MOTIVE protocol.

4.2. Level of Utilization of E-MOTIVE among Midwives in Managing Postpartum Hemorrhage

The study revealed a moderate level of utilization of E-MOTIVE among midwives (mean = 3.77 ± 1.16). Although most respondents confirmed that they occasionally applied aspects of E-MOTIVE, such as uterine massage, administration of oxytocin, and tranexamic acid, the use of calibrated blood-collection drapes and simultaneous interventions was inconsistent. This finding is supported by evidence from a recent study conducted in Addis Ababa, Ethiopia, which reported that only 30.4% of midwives demonstrated good practice related to PPH management, compared with 69.6% with poor practice (95% CI: 62.4–75.4), which indicated that a majority of providers struggle with consistent application of evidence-based techniques [14]. Similarly, a cross-sectional study in the Tigray region of Ethiopia found that less than half (43.5%) of midwives exhibited good practice toward active management of the third stage of labor, which is a core component of effective PPH prevention, indicating persistent challenges in translating knowledge into routine practice [15]. In contrast, evidence from an intervention study in Rwanda demonstrated that structured training using a mobile learning (mLearning) approach significantly improved nurses' and midwives' knowledge and skills in PPH management, with a 17.1 percentage point increase in PPH knowledge (SD = 8.8) and a 2.6 percentage point increase in PPH skills (SD = 5.9) following the intervention [16]. Collectively, these findings align with the moderate utilization observed in the present study and underscore the critical role of continuous training, supportive supervision, and availability of essential resources in enhancing consistent implementation of comprehensive PPH management bundles such as E-MOTIVE.

4.3. The Perceived Barriers to the Implementation of E-MOTIVE among Midwives

The findings showed that the major barriers to E-MOTIVE implementation were a lack of training, inadequate resources, and limited skilled personnel, as indicated by a composite mean of 4.16 ± 0.96. Respondents also agreed that simplifying E-MOTIVE steps and providing mentorship would promote adoption. These findings are consistent with evidence from other settings where systemic limitations impede effective Postpartum Hemorrhage (PPH) care. In the Dominican Republic, 45% of healthcare providers reported insufficient training in PPH management, and only 30% of facilities possessed essential equipment such as Bakri balloons, which highlights critical gaps in both knowledge and resources [17]. Similarly, in Dar es Salaam, Tanzania, just 53.9% of providers reported using direct blood-loss measurement, with many emphasizing the need for additional

training and supplies to manage PPH emergencies effectively [18]. In Uganda, a national referral hospital survey found that only 39.8% of providers were competent in PPH management despite 81% demonstrating good knowledge, which illustrates that theoretical understanding alone does not ensure effective practice without adequate skills and support [19]. A cross-sectional assessment in Kampala revealed that merely 26.3% of health workers had adequate PPH knowledge, and only 14.3% of facilities were fully prepared to manage PPH, underscoring workforce and facility readiness challenges [20]. Finally, a global survey of maternity care providers indicated that only 39.2% had access to Non-pneumatic Anti-Shock Garments (NASG), with 60% of those lacking availability situated in low- and middle-income countries, and this demonstrates that widespread equipment constraints hinder timely intervention [21]. Collectively, these quantitative indicators corroborate the present findings and emphasize that comprehensive training, adequate resourcing, and workforce strengthening are essential to overcome barriers and enhance the adoption of evidence-based interventions such as E-MOTIVE.

4.4. Factors Influencing the Knowledge and Utilization of E-MOTIVE among Midwives

The study found that institutional and interpersonal factors strongly influence both knowledge and utilization, with a composite mean of 4.09 ± 1.00. These include adequate training, supportive hospital policies, teamwork, peer motivation, availability of resources, and the perceived impact on maternal outcomes. This finding is supported by quantitative evidence showing that structured training and teamwork enhance provider competence in PPH and emergency obstetric care. In a mixed methods evaluation of Emergency Obstetric and Newborn Care training in Gondar, Ethiopia, mean evaluation scores for lectures and breakout sessions were 4.51 (SD = 0.19) and 4.52 (SD = 0.18), respectively, on a 5-point scale, which highlighted high perceived effectiveness of institutional training programs on knowledge and clinical behavior change [22]. Similarly, inter-professional Obstetric Simulation Training and Teamwork (OB-STaT) implemented across multiple hospitals demonstrated improved teamwork scores, with clinical teamwork mean increasing from 5.82 (SD = 2.0) pre-training toward higher values, which indicated enhanced collaborative performance after structured simulation and teamwork interventions [23]. Evidence from simulation-based education among student nurse-midwives in Tanzania showed significant increases in mean knowledge and skills scores post-training compared to baseline, with adjusted mean differences of 11.7 (95% CI: 11.0–12.5) for knowledge and 13.9 (95% CI: 12.7–15.1) for skills, reinforcing the role of interactive, structured training in strengthening clinical competence [24]. These studies collectively quantify how training effectiveness, teamwork, and institutional preparedness contribute to improved knowledge and utilization patterns, aligning with the present findings that institutional support and interpersonal dynamics are vital determinants of effective E-MOTIVE adoption.

5. Conclusion

The study concludes that knowledge of the E-MOTIVE among midwives is adequate, but its utilization remains suboptimal. This gap suggests that knowledge does not always translate into practice due to factors such as inadequate resources, high workload, limited institutional support, and insufficient hands-on training. However, there is a statistically significant relationship that exists between knowledge and utilization, which addresses systemic, infrastructural, and policy-related barriers alongside continuous professional development, which is essential to improve consistent application of the E-MOTIVE bundle and optimization of maternal health outcomes.

Recommendations

Based on the findings of this study, the following recommendations were made.

- Regular workshops, drills, and simulations should be organized to reinforce E-MOTIVE skills among midwives.
- Ensure a steady supply of uterotonics, tranexamic acid, IV fluids, and calibrated blood-collection drapes.
- Institutionalize E-MOTIVE as a standard PPH management protocol across all healthcare levels.
- Establish quality assurance mechanisms to evaluate midwives' adherence to E-MOTIVE during audits and clinical reviews.

Implications for Practice

- The routine integration of the E-MOTIVE protocol into standard labor and postnatal care can enhance early detection and timely management of postpartum haemorrhage.
- Continuous in-service training and mentorship for midwives are essential to bridge the gap between knowledge and consistent utilization.
- The availability of E-MOTIVE tools, such as calibrated blood collection drapes and uterotonics, should be prioritized at the facility level.
- Proper supportive supervision and adherence to standardized clinical guidelines can improve compliance and quality of maternal care.

Relationship Between E-MOTIVE Utilization and Patient Outcomes

- The effective use of the E-MOTIVE bundle is associated with earlier recognition of excessive blood loss, which reduces delays in proper intervention.
- Good, timely implementation contributes to decreased severity of postpartum haemorrhage and lowers the risk of maternal complications such as shock, organ failure,

and death.
- Adequately improved protocol utilization enhances overall maternal safety and promotes better postnatal recovery outcomes.

Integration of Qualitative Data for Richer Insights

- In addition to quantitative data, the study incorporated qualitative inputs obtained through brief open-ended questions and direct clinical observations of practice.
- Qualitative findings provided contextual explanations for observed gaps between knowledge and utilization, which included workload constraints, resource limitations, and institutional practices.
- The integration of qualitative evidence enhanced the interpretation of quantitative results and offered deeper insight into real-world implementation challenges of the E-MOTIVE protocol.

Directions for Future Research

- Longitudinal and intervention-based studies are recommended to assess sustained utilization and long-term maternal outcomes.
- Comparative studies across multiple facilities or regions would enhance generalizability and policy relevance.
- Further research should examine the influence of leadership, supervision, and health system readiness on protocol adherence.

Comparison of Existing Literature and State-of-the-Art Approaches

The improved outcomes observed in this study, compared with some previously reported findings, may be attributed to the combined assessment of knowledge, institutional factors, and utilization patterns rather than focusing on a single determinant. The inclusion of regression analysis allowed for control of confounding variables, which strengthened causal interpretation beyond descriptive or bivariate approaches commonly reported in similar studies. Additionally, the focus on a facility-level evaluation provided context-specific insights that extended the existing evidence on E-MOTIVE effectiveness. These methodological strengths likely contributed to clearer identification of predictors of utilization and more robust findings relative to earlier reports in the literature.

References

[1] Sarah J. Kilpatrick, and Lu-Ann Papile, and George A. Macones, *Guidelines for Perinatal Care,* American Academy of Pediatrics, 2017. [CrossRef] [Publisher Link]

[2] Wedad M. Almutairi, "Literature Review: Physiological Management for Preventing Postpartum Hemorrhage," *Healthcare*, vol. 9, no. 6, 2021. [CrossRef] [Google Scholar] [Publisher Link]

[3] Jessica L. Bienstock, Ahizechukwu C. Eke, and Nancy A. Hueppchen, "Postpartum Hemorrhage," *The New England Journal of Medicine*, vol. 384, no. 17, pp. 1635–1645, 2021. [CrossRef] [Google Scholar] [Publisher Link]

[4] Megan Saad et al., "Patient Perceptions of the Benefits and Barriers of Virtual Postnatal Care: A Qualitative Study," *BMC Pregnancy and Childbirth*, vol. 21, 2021. [CrossRef] [Google Scholar] [Publisher Link]

[5] National Planning Commission, National Integrated Infrastructure Master Plan (NIIMP 2020–2043), Federal Republic of Nigeria, 2015. [Google Scholar] [Publisher Link]

[6] Elyse J. Watkins, and Kelley Stem, "Postpartum Hemorrhage," *Journal of the American Academy of Physician Assistants*, vol. 33, no. 4, pp. 29-33, 2020. [CrossRef] [Publisher Link]

[7] Marlee Cares, "Implementation and Evaluation of the Quantification of Blood Loss and Postpartum Hemorrhage Education," *Doctor of Nursing Practice Scholarly Project*, 2021. [Google Scholar] [Publisher Link]

[8] M. Widmer et al., "Maternal Characteristics and Causes Associated with Refractory Postpartum Haemorrhage After Vaginal Birth: A Secondary Analysis of the WHO CHAMPION Trial Data," *BJOG: An International Journal of Obstetrics & Gynaecology*, vol. 127, no. 5, pp. 628–634, 2020. [CrossRef] [Google Scholar] [Publisher Link]

[9] Wafaa Taha Ibrahim Elgzar, Hanan Ibrahim Ibrahim, and Hanan Heiba Elkhateeb, "Effect of Placental Cord Drainage on the Third Stage of Labour Progress and Incidence of Postpartum Haemorrhage: Randomized Controlled Clinical Trial," *South Asian Research Journal of Nursing and Healthcare*, vol. 2, no. 1, 2020. [CrossRef] [Google Scholar] [Publisher Link]

[10] Leslie R. Carnahan et al., "Healthcare Providers' Knowledge and Practices Associated with Postpartum Hemorrhage During Facility Delivery in Dar es Salaam, Tanzania," *International Journal of Gynecology & Obstetrics*, vol. 135, no. 3, pp. 268-271, 2016. [CrossRef] [Google Scholar] [Publisher Link]

[11] Junita Henry et al., "Health Care Providers' Knowledge of Clinical Protocols for Postpartum Hemorrhage Care in Kenya: A Cross-sectional Study," *BMC Pregnancy and Childbirth*, vol. 22, 2022. [CrossRef] [Google Scholar] [Publisher Link]

[12] Aurore Nishimwe et al., "The Effect of an mLearning Application on Nurses' and Midwives' Knowledge and Skills for the Management of Postpartum Hemorrhage and Neonatal Resuscitation: Pre–post Intervention Study," *Human Resources for Health*, vol. 19, 2021. [CrossRef] [Google Scholar] [Publisher Link]

[13] Ashenu Bidiru et al., "Assessment of Midwives' Knowledge, Practice, and Associated Factors Toward Postpartum Hemorrhage Management in Public Hospitals of Addis Ababa, Ethiopia," *AJOG Global Reports*, vol. 5, no. 2, 2025. [CrossRef] [Google Scholar] [Publisher Link]

[14] Getu Engida Wake, and Girma Wogie, "Assessment of Knowledge, Practice, and Associated Factors toward Active Management of the Third Stage of Labor among Obstetric Care Providers in Tigray Region, Ethiopia," *BioMed Research International*, vol. 2020, pp. 1-10, 2020. [CrossRef] [Google Scholar] [Publisher Link]

[15] Yotin Ramon Pérez, "Evaluation of Postpartum Hemorrhage Management in the Dominican Republic: A Cross-sectional Study," *Annals of Medical and Health Sciences Research*, 2024. [Publisher Link]

[16] Steven Baguma, Kagawa N. Mike, and Susan Obore, "Training Health Workers to Prevent and Manage Postpartum Hemorrhage," *MedRxiv*, 2025. [CrossRef] [Publisher Link]

[17] Abdullahi Teituku et al., "Facility Readiness and Knowledge of Health Care Workers to Manage Postpartum Hemorrhage in Public Health Facilities within Kampala Metropolitan Areas, Uganda," *BMC Reproductive Health*, 2025. [CrossRef] [Google Scholar] [Publisher Link]

[18] Akaninyene E. Ubom et al., "Postpartum Hemorrhage: Findings of a Global Survey by the World Association of Trainees in Obstetrics and Gynecology (WATOG)," *International Journal of Gynecology & Obstetrics,* vol. 171, no. 2, pp. 593-600, 2025. [CrossRef] [Google Scholar] [Publisher Link]

[19] Myrrith Hulsbergen et al., "Evaluation of the Emergency Obstetric and Newborn Care Training in Gondar, Ethiopia; A Mixed Methods Study," *PLOS Global Public Health*, vol. 3, no. 9, 2023. [CrossRef] [Google Scholar] [Publisher Link]

[20] Joy A. Greer et al., "Obstetric Simulation Training and Teamwork (OB-STaT): Immediate Impact on Knowledge, Teamwork, and Adherence to Hemorrhage Protocols," *Journal of the Society for Simulation in Healthcare,* vol. 18, no. 1, pp. 32-41, 2023. [CrossRef] [Google Scholar] [Publisher Link]

[21] Rose Faustine et al., "Improving Tanzanian student Nurse-midwives' Knowledge, Skills, Self-confidence, and Satisfaction in Preventing and Managing Postpartum Hemorrhage through Simulation-based Education: A Quasi-experimental Study," *BMC Pregnancy and Childbirth*, vol. 25, 2025. [CrossRef] [Google Scholar] [Publisher Link]